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A Revision of the Dufoureine Genus *Micralictoides* Timberlake (Hymenoptera: Halictidae)

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Abstract.—The southwestern North American genus, *Micralictoides,* is reviewed, a key to species presented, five new species described *(M. chaenactidis, M. dinoceps, M. grossus, M. linsleyi,* and *M. quadriceps),* and new records provided for the three previously included species.

Timberlake (1939) established *Micralictoides* as a subgenus of *Dufourea* for two species, *D. altadenae* (Michener) and *D. ruficaudus* (Michener), described under *Halictoides* (Michener 1937). Bohart (1942) later gave *Micralictoides* generic status and described a third species, *M. mojavensis.* Michener (1965), in a generic review of the New World Dufoureinae, briefly characterized *Micralictoides* and provided a key separating it from the other six New World genera.

Genus *Micralictoides* Timberlake

Micralictoides Timberlake 1939: 397 (as subgenus). Type: *Halictoides ruficaudus* Michener.

Generic Diagnosis.—Size small, body length 3.5 to 6 mm; abdomen of male broad as in female; punctures of head and mesonotum shallow; tergal punctures fine and shallow; body without metallic reflections; legs with tarsi (and usually tibiae) paler than femora; clypeal margin of female truncate or nearly so between tubercles; labrum very short, nearly truncate; maxillary palpus of female nearly as long as flagellum; flagellum of male with segments not or scarcely longer than broad, without modified hairs; male without modified legs; forewing with two submarginal cells, first submarginal twice as long as wide, marginal cell from apex of stigma to apex of cell no longer than distance from apex of cell to wing tip; propodeum with weak, irregular striae becoming obsolescent laterally and along posterior margin; sternum VI of male without distinct grooves, carinae, or strong protuberances, but sometimes gently swollen toward apex; sternum VII with pair of slender, depressed, apical lobes, each with terminal, incurved appendage; sternum VIII medially with broad articulating lobe, apically with slender median lobe about one-third total segment length; genital capsule swollen basally, with simple, strap-like gonostylus, distinct from gonobase, with short, strongly incurved sagitta, and knob-like, polished volsella.

Micralictoides can be distinguished from other dufoureine genera by a combination of the two submarginal cells in the forewing and the hind basitarsus which is distinctly paler than the hind femur. The configuration of metasomal sterna VII and VIII in the male is unique in the subfamily. Superficially, *Micralictoides* resembles some of the smaller species of *Dufourea* such as the *D. leachi* Timberlake

group. Both have relatively simple antennae, legs, and visible sterna in the male, and both have a swollen basal portion of the genital capsule and a shortened volsella.

Systematics.—The eight known species of *Micralictoides* can be separated into three groups based on the structure of the metasomal sterna (especially VII) and the genitalia of the males. The *altadenae* group includes four species: *M. altadenae* (Michener) with a broad face and short mouthparts, *M. chaenactidis* n. sp. and *M. linsleyi* n. sp. with face and mouthparts moderate in length, and *M. quadriceps* n. sp. with a long face and long mouthparts. The *grossus* group, which contains only *M. grossus* n. sp., may be related to *M. quadriceps* of the *altadenae* group on the basis of a somewhat similar development of sternum VI. The *ruficaudus* group includes *M. ruficaudus* (Michener), *M. mojavensis* Bohart, and *M. dinoceps* n. sp. The relationship between these three species is most apparent in the configuration of male sternum VII. This group probably developed from the *altadenae* group; in fact, the female of *M. mojavensis* is difficult to distinguish from that of *M. chaenactidis*.

Distribution.—Micralictoides is restricted to the southwestern United States where it is known only from California, Nevada, and Arizona. All eight species are found in California and only one of them, *M. chaenactidis,* ranges much beyond its borders (into north-central Nevada and west-central Arizona). In California, the various species are distributed as follows: *M. chaenactidis* in the central and southern coastal ranges and the southern deserts, *M. mojavensis* in the Mojave Desert and Los Angeles Basin, *M. dinoceps* in the San Bernardino Mountains, *M. ruficaudus* and *M. altadenae* from the central and southern coastal ranges, *M. quadriceps* and *M. grossus* in the central Sierra Nevada foothills, and *M. linsleyi* on the eastern side of the northern Sierras.

Biology.—The nesting habits of *Micralictoides* are unknown. Collection records indicate that members of the genus are remarkably oligolectic. Apparent pollen sources for *Micralictoides* are: *Allium (M. dinoceps), Chaenactis (M. chaenactidis), Eriophyllum (M. altadenae), Gilia (M. grossus), Eschscholtzia (M. ruficaudus),* and *Navarretia (M. quadriceps).* Pollen preference in *M. mojavensis* is unclear. Floral records for females include *Gilia, Salvia, Eschscholtzia, Phacelia, Layia, Baeria,* and *Malacothrix.* There are no floral associations for *M. linsleyi.*

Since species of *Micralictoides* are strikingly oligolectic, we deemed it appropriate to dedicate this paper to Dr. E. G. Linsley, whose important contributions to bee systematics and biology include special studies on problems of oligolecty, and to name one of the included new species after him.

Key to Males of *Micralictoides*

1. Head distinctly longer than wide ..... *quadriceps* n. sp.
   Head at least slightly wider than long 2
2. Abdomen largely red or reddish-brown ..... *ruficaudus* (Michener)
   Abdomen dark brown to black, segments sometimes paler apically 3
3. Sternum VI in profile with low but distinct bulge near middle, surface nearly obscured by moderately long, dense pubescence (Fig. 18), lateral arm of sternum VII short, stout basally, hammer-shaped apically (Fig. 16) .. *grossus* n. sp.
   Sternum VI nearly straight in profile, with short, sparse pubescence not at all obscuring surface (Fig. 19), lateral arm of sternum VII long, slender basally, clubbed apically (Figs. 10–12, 14, 15) 4

4. Sternum VIII with lateral arm (preceding apical "foot") with abrupt expansion near middle (Figs. 14, 15) 5
   Sternum VII with lateral arm not distinctly expanded preceding apical "foot" (Figs. 10, 11, 12) 6
5. Head width at most 1.2 times length; lateral arm of sternum VII beyond expansion slender then widened apically (Fig. 15) . . . . . *mojavensis* Bohart
   Head width 1.3 times length; lateral arm of sternum VII beyond expansion uniformly wide (Fig. 14) . . . . . *dinoceps* n. sp.
6. Sternum VIII with median apical projection short, slender, tapering toward apex throughout (Fig. 2); sternum VII with basal flaps nearly touching broadly triangular apical "foot" (Fig. 10) . . . . . *linsleyi* n. sp.
   Sternum VIII with median apical projection long, parallel sided or slightly narrowed sub-basally (Figs. 3, 4); sternum VII with basal flaps remote from oval apical "foot" (Figs. 11, 12) 7
7. Prementum shorter than eye; propodeal enclosure with well-defined but slightly irregular striae even when viewed from directly above or from slightly in front *altadenae* (Michener)
   Prementum longer than eye; propodeal enclosure appearing rugose or with striae highly irregular and difficult to trace separately, even when viewed from directly above or from slightly in front . . . . . *chaenactidis* n. sp.

KEY TO FEMALES OF *MICRALICTOIDES*

1. Head distinctly longer than wide (Fig. 38) . . . . . *quadriceps* n. sp.
   Head at least slightly broader than long (Figs. 33–37, 39, 40) 2
2. Tergum II with punctures of mid-line area mostly less than one puncture width apart (except on apical impunctate border), if punctures fine and indistinct, interpunctural areas shagreened 3
   Tergum II with punctures of mid-line area mostly more than one puncture width apart (except sometimes on basal half) and with interpunctural areas shiny . 5
3. Head more then nine tenths as long as wide (Fig. 40); distance between antennal scrobes less than median clypeal length; anterior wing (measured from apex of tegula) at least 3.5 mm long . . . . . *grossus* n. sp.
   Head less than nine tenths as long as wide; distance between antennal scrobes greater than median clypeal width; anterior wing not more than 3.4 mm long 4
4. Prementum and stipes shorter than eye; head not more than 0.82 times as long as wide (Fig. 39) . . . . . *altadenae* (Michener)
   Prementum and stipes longer than eye; head at least 0.85 times as long as wide (Fig. 35) . . . . . *chaenactidis* n. sp.
5. Frons with surface between punctures strongly shagreened . . . . . *linsleyi* n. sp.
   Frons with surface between punctures polished 6
6. Abdomen red; stipes and prementum shiny, not shagreened . . . . . *ruficaudus* (Michener)
   Abdomen black; stipes and prementum shagreened 7
7. Maxillary palpus elongate, as long or longer than stipes (Fig. 26) . . . *mojavensis* Bohart
   Maxillary palpus not elongate, shorter than stipes (Fig. 27) . . . . . *dinoceps* n. sp.

Micralictoides chaenactidis, New Species
(Figs. 4, 12, 30, 35)

Holotype male.—Length about 4.5 mm, forewing length 2.9 mm; body moderately shining, black except mid and fore tarsi, tip of hind tibia, abdomen dark brown; tegula, hind tarsi, sternum VI light brown; pubescence white, sparse, rather short, not concealing integument.

Head. Head slightly broader than length from vertex to clypeal margin (9:8); clypeus about half as long as breadth of apical truncation, its surface with rather numerous, coarse punctures; lower margin of median ocellus lower than upper eye margin; distance from median ocellus to antennal scrobe more than twice that between scrobes; mandible moderately long but not slender, apical tooth less than one-third length of mandible and slightly darker than middle third; punctures of frons close and broad except sparser between and close to ocelli; antennal scape nearly half as broad apically as long, with scattered large punctures; flagellomeres I and II distinctly, III slightly broader than long, IV to X ranging from about as long as broad to about one-fifth longer than broad; length of prementum, maxillary palpus each greater than eye length.

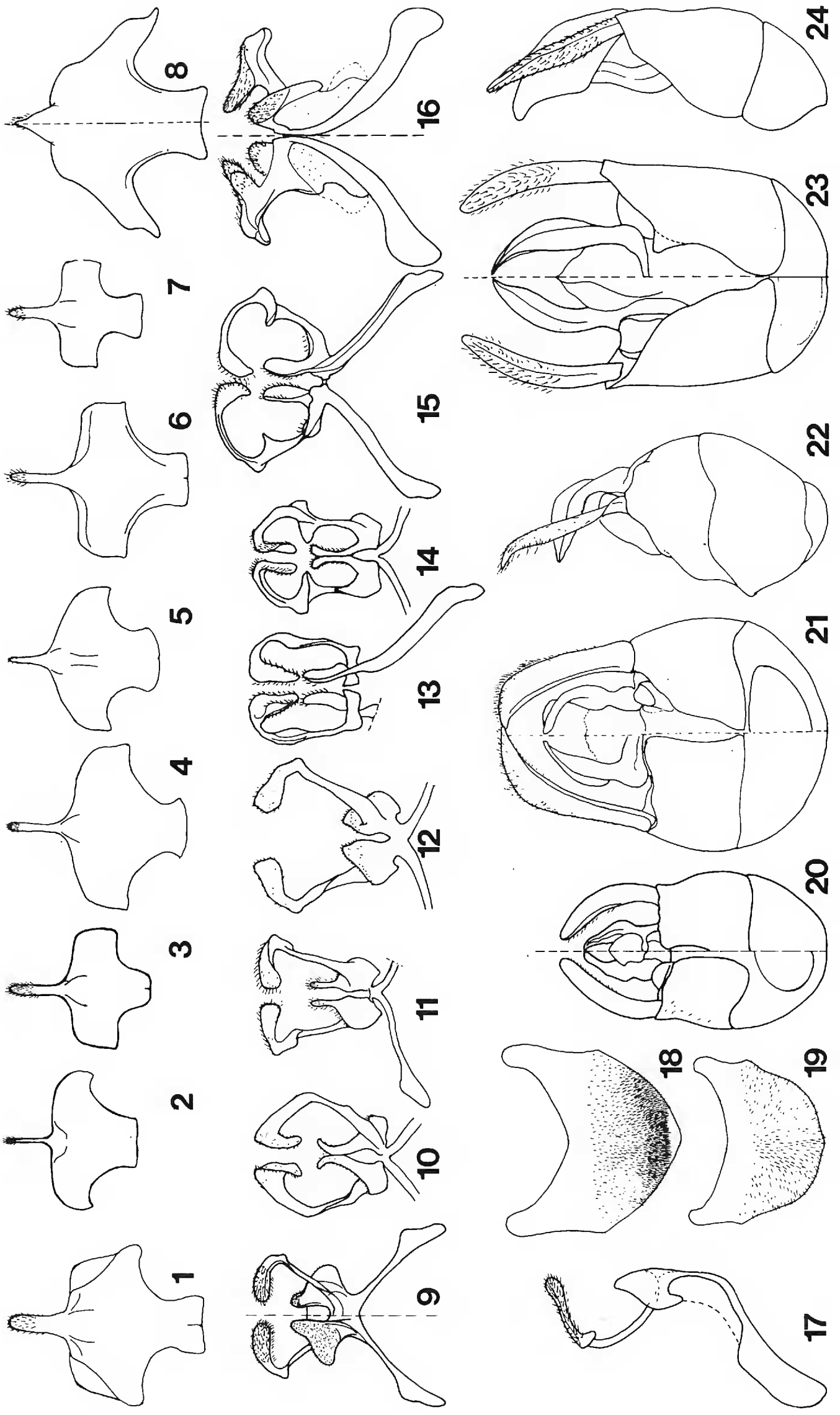
Thorax. Punctures of central half of scutum averaging about one puncture width apart, interpunctural areas not roughened; scutellum more irregularly punctate but average distance between punctures as on scutum; propodeal enclosure strongly, rather closely, somewhat irregularly striate throughout.

Abdomen. Impunctate margins of terga translucent, not much lighter than remainder of segments; punctures of first tergum about half as large, nearly as close as those on scutellum, those on succeeding terga successively smaller but not minute; sternum VI practically straight in profile, uniformly sparsely haired; sternum VII as in Fig. 12; sternum VIII as in Fig. 4.

Female.—Differs from male in having the face much more polished, punctation of frons sparse (usually separated by two or more puncture widths) and with an additional scattering of much smaller punctures. Scutum and scutellum rather polished, with fine punctures generally more than one puncture width apart submedially. Abdominal terga more finely punctate, generally more polished. Hind tibia nearly as light as hind basitarsus, dorsal scopal hairs longer than apical width of tibia. Elevated portion of clypeus slightly rounded apically, marginal truncation about twice as broad as long, head and mouthparts proportioned as in Figs. 30, 35.

Type Material.—Holotype male: ARIZONA, Yavapai Co., 30 miles (48.3 km) NW Wickenburg 16–IV–1965, *Chaenactis,* G. E. Bohart, P. F. Torchio, N. Youssef. Paratypes: Thirty-nine females and four males, same data as holotype; Pima County: 3 females, Marana, 26–IV–1973, *Chaenactis douglasii,* G. E. Bohart; 3 males, 9 females, Silver Bell Bajada, J. L. Neff; Pinal County: 1 male, Mammoth, 29–III–68, *Phacelia,* Torchio & Youssef. Holotype deposited at U.S. National Museum, paratypes at BBSL and LACM.

Additional Material.—CALIFORNIA. Los Angeles County: 1 male, Aliso Canyon, 3–V–1934, C. D. Michener; 1 female, Little Rock, Mojave Desert, 20–V–1937, E. P. VanDuzee; 1 female, Lovejoy Butte, 11–V–1944, *Acamptopappus,* P. H. Timberlake; 1 female, Mint Canyon, 3–V–1936, E. G. Linsley; 2 males, Newhall, 20–IV–1940, R. M. Bohart; 1 female, Palmdale, 2 miles (3.2 km) E, 17–V–1937, *Astragulus,* E. P. VanDuzee; 1 male, Piute Butte, Mojave Desert, 12–V–1944, A. L. Melander; 6 males, 15 females, Piute Butte, S of,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12–V–1944, *Chaenactis brachypappa,* P. H. Timberlake; 1 male, 1 female, Tapia Park, 18–IV–1953; 3 males, Three Points, 2–V–1968, D. Veirs. Riverside County: 8 males, 3 females, Joshua Tree Natl. Mon., 20–V–1970, *Chaenactis,* P. F. & D. M. Torchio. San Benito County: 1 male, 1 female, Pinnacles Natl. Mon. vicinity, 5–V–1979, *Chaenactis glabriuscula,* A. R. Moldenke; 1 female, Pinnacles, 3 miles (4.8 km) NE, 27–IV–1962, J. K. Drew; 1 female, same except *Chaenactis glabriuscula,* R. W. Thorp. San Bernardino County: 2 males, Morongo Valley, 21–IV–1957, R. R. Snelling & M. D. Stage; 3 females, same except *Malacothrix*; 1 male, Wildwood Cyn., 3 miles (4.8 km) E Yucaipa, 29–V–1977, T. Griswold. San Luis Obispo County: 1 male, Black Mt., 6 air miles (9.7 km) NE Pozo, 3300′–3600′ (1006m–1097m), 1–V–1962, *Eriophyllum confertiflorum,* C. A. Toschi; 2 males, Black Mt., same except J. Powell; 2 males, 2 females, Creston, 10 miles (16.1 km) SE, 25–IV–1968, J. Powell; 1 male, Creston, 10 miles (16.1 km) SE, 25–IV–1968, D. Veirs; 2 males, same except *Malacothrix,* J. Doyen; 1 male, Creston, 2.5 miles (4.0 km) S, 4–V–1962, C. A. Toschi; 4 males, La Panza Camp, 12 miles (19.3 km) NE Pozo, 29–IV–1962, *Eriophyllum confertiflorum,* P. H. Timberlake; 2 males, same except P. D. Hurd; 27 females, Santa Margarita, 6 miles (9.7 km) NE, 5–V–1962, *Chaenactis glabriuscula,* P. H. Timberlake; 5 males, 1 female, Shandon, 7 miles (11.3 km) SW, 24–IV–1960, J. W. MacSwain. Ventura County: 1 male, Chuchupate Ranger Station, base Frazier Mt., 10–V–1959, *Baeria chrysostoma,* P. H. Timberlake; 1 male, same except 8–V–1959, P. D. Hurd; 1 female, Hungry Valley, 5 miles (8.0 km) S Gorman, 4–V–1959, *Chaenactis glabriuscula,* J. Powell; 1 male, same except 6–V–1959, J. R. Powers; 26 females, same except P. H. Timberlake; 8 males, 29 females, same except 9–V–1959, P. H. Timberlake; 20 males, 51 females, Quatal Canyon, NW corner Ventura Co., 9–V–1959, *Chaenactis glabriuscula,* P. H. Timberlake; 1 male, same except P. D. Hurd; 1 male, same except *Eriophyllum confertiflorum,* C. W. O'Brien; 1 female, same except J. Powell; 1 female, same except no floral data, J. R. Powers; 1 female, same except G. I. Stage. NEVADA. Lander County: 3 males, 2 females, Battle Mountain, 12–VI–1962, *Chaenactis,* G. E. Bohart; 1 female, same except on Cruciferae. Specimens in the collections of BBSL, CAS, CIS, LACM, and UCR.

Distribution.—This is the widest ranging of the *Micralictoides* species, ranging from the desert regions of Nevada and Arizona across the Sonoran and southern Mojave Deserts of California and into drier parts of the coastal ranges of California.

Discussion.—M. chaenactidis is probably closer to *M. altadenae* than to other species on the basis of its almost identical male sterna and genitalia. It differs principally in having longer mouthparts and face, and sparser punctation on the female frons. The female of *M. chaenactidis* is also similar to that of *M. mojavensis,* but the basal zone of the propodeum is more strongly sculptured and the dorsal scopal hairs of the hind tibia are longer than the apical width of the tibia. The male differs from *M. mojavensis* most obviously in sternum VII (Fig. 12), but it also has a more strongly punctate clypeus and more roughened frons.

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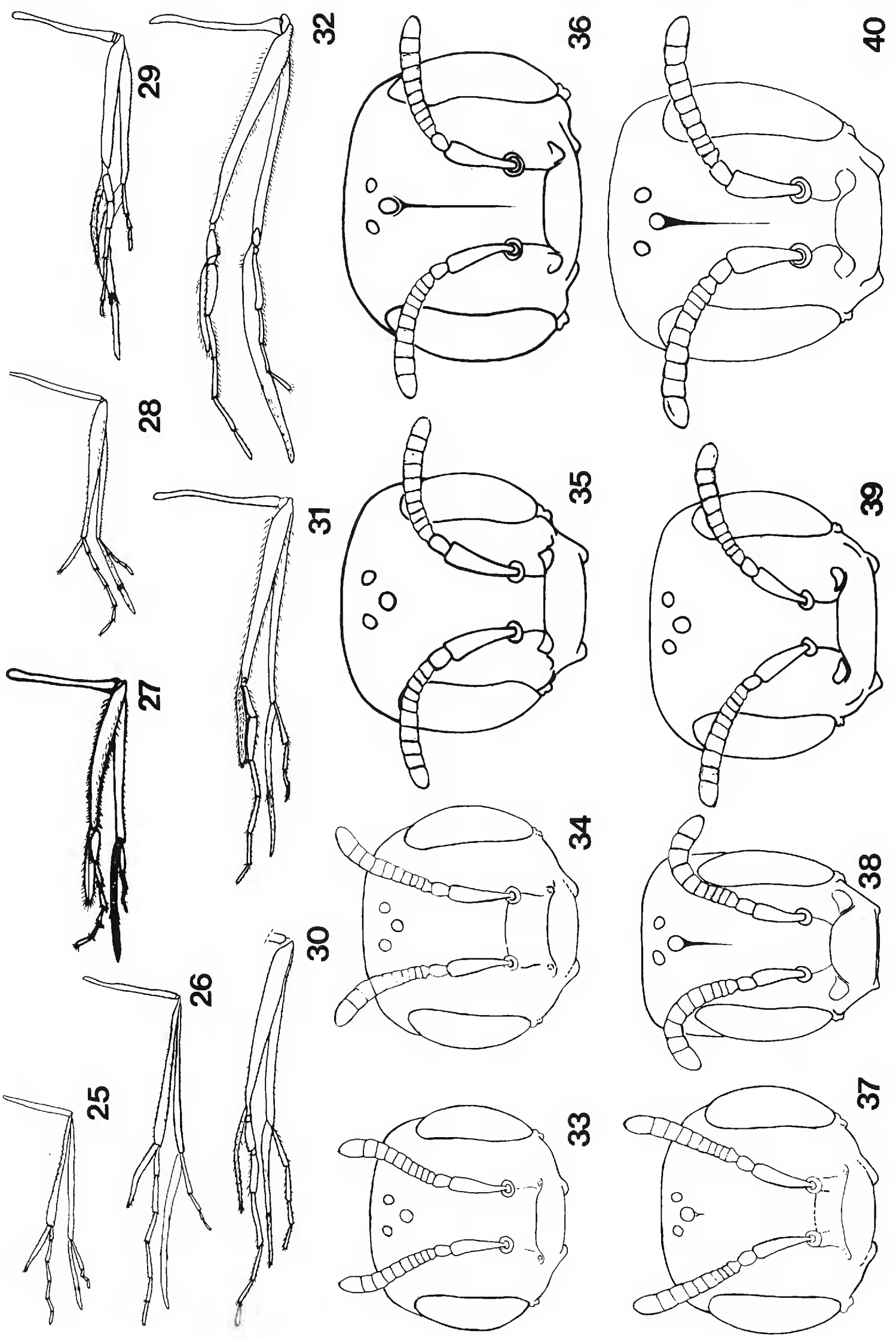
Figs. 1–24. Males. Figs. 1–8: Metasomal sternum VIII. Fig. 1, *M. quadriceps*; Fig. 2, *M. linsleyi*; Fig. 3, *M. altadenae*; Fig. 4, *M. chaenactidis*; Fig. 5, *M. ruficaudus*; Fig. 6, *M. dinoceps*; Fig. 7, *M. mojavensis*; Fig. 8, *M. grossus*. Figs. 9–16: Metasomal sternum VII. Fig. 9, *M. quadriceps*; Fig. 10, *M. linsleyi*; Fig. 11, *M. altadenae*; Fig. 12, *M. chaenactidis*; Fig. 13, *M. ruficaudus*; Fig. 14, *M. dinoceps*; Fig. 15, *M. mojavensis*; Fig. 16, *M. grossus*. Fig. 17: Metasomal sternum VII, lateral view, *M. quadriceps*. Figs. 18–19: Metasomal sternum VI. Fig. 18, *M. grossus*; Fig. 19, *M. ruficaudus*. Figs. 20–24: Genital capsule. Fig. 20, *M. quadriceps*; Figs. 21, 22, *M. grossus*; Figs. 23, 24, *M. dinoceps*. (Illustrations not drawn to scale.)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Specimens from California localities differ from the type series in having the integument less intensely black, the frons of the female more uniformly and usually a little more densely punctured, and the abdominal terga slightly more coarsely and closely punctate.

Micralictoides altadenae (MICHENER)
(Figs. 3, 11, 29, 39)

Halictoides altadenae Michener 1937: 395 (Holotype female: SMEK).
Dufourea (Micralictoides) altadenae; Timberlake 1939: 397.
Micralictoides altadenae; Bohart 1942: 123.

Male.—Length about 4.5 mm, forewing length 3 mm; very similar to *M. chaenactidis,* but differs in having a wider head (8:7) and shorter mouthparts. It also has denser pubescence on the foreparts of the face (partially obscuring the clypeus), somewhat paler integument of the abdomen (dark brown instead of largely glossy black), and partially brownish (instead of entirely whitish) pubescence on terga IV and V. The mid and hind basitarsi are somewhat paler in contrast to the tibiae and the abdominal pubescence is generally more abundant. Sterna VI, VII (Fig. 11), VIII (Fig. 3) and the genital capsule are similar to those of *M. chaenactidis.*

Female.—Much like *M. chaenactidis* but differs in having a wider face and shorter mouthparts (Fig. 29, 39). Punctures of the frons are generally larger and closer together (from less than one to slightly over one puncture width apart) and those of the scutum are denser and more irregular in size (averaging about one puncture width apart). The integument is somewhat paler (mostly dark brown on the abdomen instead of mostly black) and the hind tibia is almost the same color as the basitarsus instead of distinctly darker brown.

Distribution.—Known only from two widely separated localities in cismontane California, the type series from Altadena, Los Angeles County, California and a new record from Yolo County. (The record from Aliso Canyon, Los Angeles County, is an error and actually represents *M. chaenactidis.*)

New Records.—CALIFORNIA. Yolo County: 2 males, 4 females, 30–V–1956, R. M. Bohart.

Discussion.—This species is very close to *M. chaenactidis* (for differences, see discussion under the latter). The female resembles *M. mojavensis* as well, but has shorter mouthparts (Fig. 29) and browner abdominal pubescence. The face is proportionately broader than that of *M. mojavensis* (compare Fig. 39 and Fig. 34) but the contrast is less pronounced than in comparison with *M. chaenactidis.* The male is easily distinguished from *M. mojavensis* on the basis of sternum VII.

Figs. 25–40. Females. Mouthparts in lateral view. Fig. 25, *M. linsleyi;* Fig. 26, *M. mojavensis;* Fig. 27, *M. dinoceps;* Fig. 28, *M. ruficaudus;* Fig. 29, *M. altadenae;* Fig. 30, *M. chaenactidis;* Fig. 31, *M. quadriceps;* Fig. 32, *M. grossus.* Figs. 33–40: Head in frontal view. Fig. 33, *M. linsleyi;* Fig. 34, *M. mojavensis;* Fig. 35, *M. chaenactidis;* Fig. 36, *M. dinoceps;* Fig. 37, *M. ruficaudus;* Fig. 38, *M. quadriceps;* Fig. 39, *M. altadenae;* Fig. 40, *M. grossus.* (Illustrations not drawn to scale.)

Micralictoides linsleyi, *New Species*
(Figs. 2, 10, 25, 33)

Holotype male.—Length about 3.5 mm, forewing length 2.5 mm; body black except antenna, tegula, tarsi brown; abdomen slightly reddish. Pubescence white, sparse, rather short, not concealing integument.

Head. Head length less than width (0.80); clypeus one-half as long as width of truncation, its surface with dense, coarse punctures; lower margin of midocellus well below upper eye margin; distance from median ocellus to antennal scrobe approximately twice that between antennal scrobes; mandible moderately long but not slender, apical tooth less than one-third length of mandible, slightly darker than middle part; punctures of frons close and broad; antennal scape one-third as broad apically as long, with scattered large punctures; flagellomeres I–III distinctly broader than long, IV–X ranging from as long as broad to one and one-half times as long as broad; prementum and stipes slightly shagreened, length of prementum slightly greater than eye length, maxillary palpus approximately equal to eye length.

Thorax. Punctures of disk of scutum and scutellum more than a puncture width apart; interspaces shiny; propodeal enclosure with fine, close, irregular carinae not reaching posterior margin.

Abdomen. Impunctate margins of terga translucent, not much lighter than remainder of segments; punctures of terga as large as those on scutum and scutellum but much sparser; sternum VI practically straight in profile, with a few long hairs medially; sternum VII as in Fig. 10, sternum VIII as in Fig. 2.

Female.—Head proportions and mouthparts as in Figs. 25, 33; elevated preapical margin of clypeus nearly straight; vertex in frontal view well elevated behind eye; scutum and scutellum rather polished, punctures finer and much closer than in male; hind tibia with dorsal scopal hairs not as long as apical width of tibia. Abdominal punctation as in male.

Type Material.—Holotype male: NEVADA, Washoe Co., 4 miles (6.4 km) N Sparks, 18–VI–1959, G. I. Stage. Paratypes: 7 females, same data as holotype; 1 female same except 3.4 miles (5.5 km) N of Sparks. Holotype deposited at CAS, paratypes at BBSL, LACM, and UCB.

Additional Material.—CALIFORNIA. Lassen County: 1 male, Litchfield, 10.6 miles (17.1 km) N, 19–VI–1959; 1 male, Ravendale, 10 miles (16.1 km) S, 5–VI–1964, R. C. Dickson; 1 male, Termo, 9–VI–1960, G. I. Stage.

Distribution.—Eastern side of the northern Sierra Nevada Mountains.

Discussion.—Females of *M. linsleyi* are similar to those of *M. ruficaudus*. Differences include frons roughened between punctures, vertex elevated above eyes, and preapical margin of clypeus less arcuate.

The males are distinct from those of *M. ruficaudus* in having the abdominal reddish coloration nearly confined to the apical tergal margins. From other *Micralictoides* males, they can be distinguished by the contrastingly reddish brown color of the apical tergal margins and by the configuration of sterna VII and VIII.

Micralictoides quadriceps, NEW SPECIES
(Figs. 1, 9, 17, 20, 31, 38)

Holotype male.—Length about 4 mm, forewing length 2.6 mm; body dull black, with close, broad, rather shallow punctures and short, pale, sparse pubescence.

Head. Face from vertex to clypeal margin subquadrate, broadened apically, head slightly longer than broad (7:6.5); lower margin of median ocellus above upper eye margin; distance from median ocellus to antennal scrobe about three times that between scrobes or between lateral ocelli; mandibles unusually long, slender, with middle one-third yellowish; punctures of frons separated by much less than one puncture width except a little sparser near ocelli and medially on clypeus; clypeal integument only slightly obscured by pubescence; antennal scape shining between punctures and three times as long as broad; flagellomeres I and III to XI longer than broad; mouthparts (including palpi) over twice as long as mesonotum, metanotum, dorsal face of propodeum combined.

Thorax. Scutal punctures moderately strong, uniform, averaging less than one puncture width apart; median impressed line well developed on scutum and scutellum; scutal width (between tegulae) less than length of scutum and scutellum combined (4:5); hind basitarsus, tip of hind femur, yellowish brown, other basitarsi, all femoro-tibial areas brown; dorsal propodeal enclosure with moderately regular striae laterally, weak, irregular ones medially.

Abdomen. Transparent marginal zones of terga conspicuously lighter than remainder; discs of terga with fine, rather shallow punctures from one to two or more puncture widths apart; sternum VI with shallow median impression and rather abrupt bend in dorsal direction at apical one-fifth, the sternum not obscured in ventral view by rather abundant preapical zone of pubescence; sternum VII as in Figs. 9, 17; sternum VIII as in Fig. 1.

Female.—Similar to male, but head longer, more parallel sided (Fig. 38), labrum longer, rounded apically; mouthparts as in Fig. 31; clypeus with seven or eight large, well separated punctures on flattened portion; hind basitarsus, tibia, tip of femur orange-yellow; discs of terga more closely punctured and minutely roughened.

Type Material.—Holotype male: CALIFORNIA, Amador County, Daffodil Hill, 3–VI–1963, R. M. Bohart. Paratypes: 48 males, 3 females, same as holotype; 34 males, 1 female, same except F. D. Parker; 55 males, 2 females, same except M. E. Irwin; 8 males, 4 females, Volcano, Amador County, California, 4–VI–1961, *Navarretia,* R. M. Bohart. Holotype deposited at UCD; paratypes at BBSL and UCD.

Additional Material.—1 female, Dunlap, Fresno County, California, 25–VI–1963, R. R. Snelling; 1 female, Bear Valley, Placer County, California, 4–VII–1956, R. R. Snelling. Specimens at LACM.

Distribution.—Known only from the western foothills of the Sierra Nevada Mountains.

Discussion.—Variation is slight in this species. Some specimens are smaller than those described above and some of the males have the face nearly as parallel-sided as the females.

The elongated, nearly parallel-sided face is unique in the genus. The male genitalia and sterna closely resemble those of *M. chaenactidis* and *M. altadenae.* On the other hand, the reflexed tip of sternum VI bears some resemblance to that of *M. grossus.*

Micralictoides grossus, New Species

(Figs. 8, 16, 18, 21, 22, 32, 40)

Holotype male.—Length about 6 mm, forewing length 4 mm; body dull black, closely punctured on head but only moderately so elsewhere, the punctures deeper

than usual for the genus; pubescence pale brownish, moderately profuse, partially obscuring lower parts of face, side of mesepisternum, tip of abdomen.

Head. Head slightly broader than long (9:8.5); lower margin of median ocellus slightly below upper eye margin; distance form median ocellus to antennal scrobe less than three times that between scrobes (6:2.5) and about twice that between lateral ocelli; punctures of face, including clypeus, less than one puncture width apart except close to ocelli, in subantennal area; scape dull, rough, less than twice as long as broad; flagellomeres mostly broader than long; mandible moderately long, black basally, reddish apically, the apical tooth less than one-third as long as mandible; tongue with total length slightly less than twice that of mesonotum, metanotum, dorsal enclosure of propodeum combined (17:9).

Thorax. Punctures of scutum averaging about one puncture width apart, not unusually broad or shallow, those of scutellum sparser sublaterally; median, impressed line of scutum visible on scutellum only as dense row of punctures; width of scutum between tegulae as great as length of scutum and scutellum combined; basitarsi, apical portion of posterior tibia yellowish; middle two-thirds of posterior tibia as dark as femur; dorsal propodeal enclosure appearing finely granular with superimposed, weak, irregular striae.

Abdomen. Dorsally longer than broad (14:10); apical impunctate margins of terga transparent, rather inconspicuous; discs of terga with moderately fine punctures, mostly ranging from one to two puncture widths apart; sternum VI conspicuously bulging in profile, the bulge densely covered with reddish-brown pubescence (Fig. 18); sternum VII as in Fig. 16; sternum VIII as in Fig. 8.

Female.—As in male but larger (length 6 mm) with pubescence shorter, generally sparser, punctation closer, stronger on scutum, clypeus with only a few large punctures on anteromedian flattened area, propodeum more finely sculptured, tergal discs less polished, a little more closely punctate, hind tibia about same color of brown as hind basitarsus, somewhat paler than hind femur. Head proportions as in Fig. 40; mouthparts as in Fig. 32.

Type Material.—Holotype male: CALIFORNIA, Tuolumne Co., Tuolumne City, 3–VI-1953, *Gilia capitata,* B. L. Rozen. Paratypes: CALIFORNIA. Tuolumne County: 1 female, same data as holotype; 2 males, 18 females, same except J. G. Rozen; 1 female, same except 22–VI–1953, J. G. Rozen; 3 males, same except 27–V–1953; 2 males, same except 29–V–1953; 1 male, Buck Meadows-Mather site, #50982, A. R. Moldenke; 1 female, Early Intake Power House, 3 miles (4.8 km) S, Stanislaus Natl. For., 1–VI–1977, #119159, P. Lincoln; 1 female, same except 2–VI–1977, *Gilia capitata,* P. Lincoln; 1 female, same except 4–VI–1977. Madera County: 1 female, North Fork, 10–V–1936, F. T. Scott. Sierra County: 1 male, Yuba River, 9 miles (14.5 km) W Goodyears Bar, 29–V–1965, C. D. MacNeill. Holotype deposited at CAS, paratypes at UCB, LACM, and BBSL.

Distribution.—Known only from the western foothills of the Sierra Nevada Mountains.

Discussion.—Size is somewhat variable in this species, the smallest male being about 4.5 mm and the smallest female 5 mm in length. Some of the males have the propodeal striae completely irregular.

This species is easily distinguished by its large size, strong, deep punctures, and dull first tergum. The male is very distinctive in sterna VI, VII and VIII and the genital capsule as illustrated. It is not closely related to any other species, although

the male shows a possible relationship to *M. quadriceps* in the bulging and pubescent profile of sternum VI.

Micralictoides ruficaudus (MICHENER)
(Figs. 5, 13, 19, 28, 37)

Halictoides ruficaudus Michener 1937: 397 (Holotype female: SMEK).
Dufourea (Micralictoides) ruficauda; Timberlake 1939: 397.
Micralictoides ruficaudus; Bohart 1942: 121.

Male.—Length about 4.5 mm, forewing length 3 mm; body black except metasomal terga I–III, and frequently IV, mostly orange (dark areas basally on I and laterally on II) and legs varying from dark brown on coxae and femora to lighter brown (but only slightly) on tarsi. Punctures of head and thorax mostly closer than one puncture width apart except about one puncture width apart on middle of scutum and sides of mesepisternum and sparse and fine subgenally; pubescence off-white, rather sparse, only slightly obscuring lower parts of face, sides of mesepisternum; that of abdominal apex yellowish.

Head. Head slightly broader than long (7:6.5); lower margin of median ocellus in line with upper eye margin; distance from median ocellus to antennal scrobe a little over twice that between scrobes or between lateral ocelli; clypeus at least half as long as breadth of truncate apical margin, surface strongly, rather closely, punctate; mandibles rather short, the apical third orange to red; antennal scape nearly half as broad as long, strongly roughened; flagellomeres II and III about twice as broad as long, much shorter than either I or IV, both of which (and all succeeding segments except the last) are broader than long; mouthparts (including palpi) about 1 1/2 times as long as mesonotum, metanotum, and dorsal enclosure of propodeum combined; terminal maxillary palpal segment longer than either of preceding segments.

Thorax. Punctures rather broad and shallow, those of median portion of scutum about one puncture width apart, those of lower portions of mesepisternum broad but very shallow, leaving its surface rather polished; tarsi only slightly paler than femora, central portion of tibiae; propodeal enclosure strongly, rather irregularly striate throughout; total propodeal length considerably greater than that of metanotum and scutellum combined.

Abdomen. Tergal discs polished but punctures rather coarse (about as large as scutal), shallow, and mostly a little more than one diameter apart; sterna completely orange in some specimens, but parts or all of sterna III–VI dark brown in others; sternum VI approximately straight in profile, with moderately dense, dark pubescence medially (Fig. 19); sternum VII (Fig. 13) similar to that of *M. mojavensis*; sternum VIII (Fig. 5) and genital capsule similar to those of *M. altadenae.*

Female.—Differs from male in having face more shining but only slightly more sparsely punctate (generally less than one diameter apart) except clypeus which has punctures two or more diameters apart; head unusually convex and with inner eye margins nearly parallel (Fig. 37); mouthparts as in Fig. 28; low portions of mesepisternum with punctures somewhat finer and scutum with punctures coarse and slightly less than one diameter apart, even medially; tarsi about unicolorous with tibiae, scarcely paler than femora; metasomal terga I to III generally orange except for large dark spot laterally on II; terga IV and V becoming darker (especially on

some specimens); tergal punctures coarse, ranging from less than one to about two diameters apart.

Distribution.—Found in the coastal ranges of California from San Diego to Marin Counties. This spring species appears to be oligolectic on *Eschscholtzia californica.*

New Records.—CALIFORNIA. Alameda County: 1 male, 8 females, Oakland, Skyline Drive, 12–V–1953, E. Gilbert. Kern County: 1 male, Kern River Pres., 1.5 miles (2.4 km) W Weldon, 21–IV–1983, J. D. Pinto & R. K. Velten. Los Angeles County: 1 female, Altadena, 2–V–1936, *Eschscholtzia californica,* C. D. Michener. Marin County: 1 female, Mill Valley, 12–V–1950, F. X. Williams; 1 female, Novato, 6–V–1962, D. C. Rentz. Monterey County: 2 males, Hastings Reserve, near Jamesburg, 3–V–1958, J. Powell; 9 males, 8 females, Hollister, 22 miles (35.4 km) S, 3–V–1982, *Eschscholtzia californica,* P. F. Torchio; 2 females, Jolon, 14 miles (22.5 km) W, 2–IV–1959, C. W. O'Brien. Riverside County: 2 males, Corona, 12 miles (19.3 km) S, I–15 & Indian Truck Trail, 14–IV–1985, *Cryptantha intermedia,* R. R. Snelling; 2 males, Riverside, 10–IV–1935, *Eschscholtzia californica,* P. H. Timberlake; 1 male, same except 12–IV–1935; 1 male, same except *Cryptantha intermedia*; 1 female, same except 12–IV–1933, *Eschscholtzia californica,* S. C. Dorman; 1 female, same except 15–IV–1929, P. H. Timberlake; 1 male, same except 15–IV–1932, *Cryptantha intermedia*; 1 male, same except 15–IV–1933, H. L. McKenzie; 1 female, same except 15–V–1934, *Cryptantha intermedia,* P. H. Timberlake; 1 female, same except 2–IV–1929, *Eschscholtzia californica*; 1 female, same except 24–IV–1928; 1 female, same except 29–III–1933, *Amsinckia douglasiana,* H. L. McKenzie; 1 male, same except 5–IV–1933, *Cryptantha intermedia,* P. H. Timberlake; 1 male, same except 9–V–1935. San Bernardino County: 1 female, Devore, 21–IV–1974, J. C. & E. M. Hall. San Luis Obispo County: 3 females, Black Mt., 6 air miles (9.7 km) NE Pozo, 3300–3600′ (1006–1097m), 1–V–1962, J. K. Drew.

Discussion.—This is a very distinctive species, apparently related to *M. mojavensis* on the basis of sternum VII in the male, but with many unusual features including the largely orange abdomen, the short male flagellum, and the coarse abdominal punctation. Except that the abdomen varies in the amount of black beyond tergum III, there is no evidence of geographical variation. This red abdomen is distinctive among *Micralictoides* except for some females of *M. linsleyi* which also exhibit orange coloration on the basal terga but differ from *M. ruficaudus* in having roughened interpunctural areas on the frons.

Micralictoides mojavensis BOHART

(Figs. 7, 15, 26, 34)

Micralictoides mojavensis Bohart 1942: 120 (Holotype male: CAS).

Male.—Length about 4.5 mm, forewing length 3 mm, head width slightly greater than length (1.1 or 1.2); similar in most respects to *M. chaenactidis,* but differs in having the clypeus and supra-clypeal area more polished, the clypeus more nearly impunctate (except basolaterally) and the punctures of the supra-clypeal area mostly separated by three or four times their diameters. The facial pubescence is somewhat sparser, not at all concealing the clypeus and supraclypeal area. The mouthparts are about as long as those of *M. chaenactidis* and distinctly longer than those of *M. altadenae.* The propodeum has the sculptured area of the enclosure more restricted

than that of *M. chaenactidis* and has a broad, nearly smooth zone laterally within the enclosural boundaries. Sternum VI resembles that of *M. chaenactidis,* but sternum VII is strikingly different (Fig. 15). Sternum VIII is similar to that of *M. chaenactidis,* but its apical process is a little broader (Fig. 7).

Female.—Very similar to *M. altadenae* and to the widespread California form of *M. chaenactidis.* Head (Fig. 34) length to breadth ratio varies from 0.88 to 0.99. Mouthparts (Fig. 26) long as in *M. chaenactidis.* Length of dorsal scopal hair on hind tibia slightly less than apical width of tibia. Tergum II with punctation of disk sparse, especially in middle.

Distribution.—Mojave Desert and Los Angeles Basin. All collection records are from mid-April to late May. Males were collected on *Gilia multicaulis* and *Platystemon californicus.*

New Records.—CALIFORNIA. Inyo County: 1 female, Darwin, 12–V–1969, J. Doyen; 2 females, same except P. Wells. Riverside County: 2 males, 1 female, Gavilan, 4–IV–1952, *Salvia columbariae,* P. H. Timberlake; 1 female, same except 22–IV–1952, *Eschscholtzia californica;* 1 female, same except 10–IV–1956; 1 female, same except 16–IV–1956, *Gilia multicaulis.* San Bernardino County: 3 females, Adelanto, 20 miles (32.2 km) N, 18–IV–1962, *Malacothrix glabrata,* P. H. Timberlake; 1 male, Atolia, 1–V–1952, R. M. Bohart; 3 males, 5 females, Mid Hills, 9 miles (14.5 km) SSE Cima, 26–V–1975, T. Griswold; 1 male, Mid Hills, Sec. 12 T12N R14E, 5620′ (1713m), 19–V–1980, T. Griswold; 1 male, Sacaton Spr., New York Mts., 4100′ (1250m), 10–V–1978, T. Griswold; 1 female, Twentynine Palms, 4 miles (6.4 km) S, 14–IV–1935, *Malacothrix californica,* P. H. Timberlake; 1 female, Victorville, 12 miles (19.3 km) W, 14–IV–1963, *Phacelia fremontii,* M. Dickson.

Discussion.—This species is difficult to distinguish from *M. chaenactidis* in its externally visible characteristics even though sternum VII of the male resembles that of *M. ruficaudus* more than it does that of *M. chaenactidis.* The female appears to be separable from *M. chaenactidis* only by the more sparse punctation of tergum II and the shorter scopal hair. Since the distribution of these two species overlaps, it is possible that our association of the sexes in *M. mojavensis* (based primarily on similarity in headshape) is not entirely correct. Longer series from single localities will probably clarify this matter in the future. The punctation and coloration of *M. mojavensis,* in general, appears to be intermediate between those of the Coast Range and more interior forms of *M. chaenactidis.* Like *M. chaenactidis,* the species differs from *altadenae* in both sexes by its narrower face (but only slightly so), longer clypeus, and longer mouthparts.

Four females from Red Rock Canyon, Kern County, California are a composite of characteristics of *M. mojavensis* and *M. dinoceps.* The head shape and propodeal sculpturing are as in *M. dinoceps,* while the scutal punctation and length of the maxillary palpi are as in *M. mojavensis.* It is possible that these females represent intermediate conditions in a polymorphic species and, consequently, that *M. dinoceps* is not a valid species. However, the available material of both *M. mojavensis* and *M. dinoceps* is quite homogeneous with respect to these two characters. It, therefore, seems possible that the Red Rock Canyon females represent a third species. Resolution of this problem must await discovery of the corresponding male.

Micralictoides dinoceps, New Species
(Figs. 6, 14, 23, 24, 27, 36)

Holotype male.—Length about 4.5 mm, forewing length 3 mm; body black except tegula, tarsi, sterna brown. Pubescence white, sparse, rather short, not concealing integument.

Head. Head distinctly broader than long (1.3); clypeus less than one-third as long as breadth of truncation, its surface with sparse, coarse punctures; lower margin of median ocellus lower than upper eye margin; distance from median ocellus to antellal scrobe less than twice that between antennal scrobes; mandible moderately long but not slender, apical tooth less than one-third length of mandible, slightly darker than middle third; punctures of frons close and broad; antennal scape one-third as broad apically as long, with scattered large punctures; flagellomeres I–III distinctly broader than long, IV–X ranging from as long as broad to one and one-half times as long as broad; prementum and stipes shagreened, length of prementum slightly greater than eye length, maxillary palpus shorter than eye length.

Thorax. Punctures of scutum and scutellum less than a puncture width apart, interspaces not shagreened; propodeal enclosure with strong, rather close, regular longitudinal carinae throughout.

Abdomen. Impunctate margins of terga translucent, not much lighter than remainder of segments; punctures of terga smaller and much sparser than those on scutum and scutellum; sternum VI practically straight in profile, uniformly sparsely haired; sternum VII as in Fig. 14, sternum VIII as in Fig. 6, genital capsule as in Figs. 23, 24.

Female.—Differs from male in having the face more polished, punctation of frons slightly more sparse; head proportioned as in Fig. 36; mouthparts as in Fig. 27; elevated portion of clypeus nearly straight apically, width of marginal truncation more than twice length; scutum and scutellum rather polished, with fine punctures less than a puncture width apart; abdominal terga with punctures as coarse, but much more sparse; hind tibia nearly as light as hind basitarsus, dorsal scopal hair no longer than apical width of tibia.

Type Material.—Holotype male. CALIFORNIA, San Bernardino Co., Arrastre Flat, 7,450 ft (2,271m), 26–VI–1979, *Allium fimbriatum,* M. H. O'Brien. Paratypes: California, San Bernardino County: 7 males and 16 females, same data as holotype; 1 female, Mill Creek, 7400′ (2,256m), 29–VI–1942, R. M. Bohart. Los Angeles County: 1 male, Valyermo, 4 miles (6.4 km) SE, 13–IV–1960, R. R. Snelling. Holotype deposited at LACM; paratypes at LACM, BBSL, and UCD.

Distribution.—Apparently restricted to the San Bernardino Mountains of southern California.

Discussion.—Males of *M. dinoceps* are close to those of *M. mojavensis* and both can be distinguished from other *Micralictoides* by the abrupt expansion near the middle of the lateral arm of sternum VII. *M. dinoceps* can be separated from *M. mojavensis* by the wider head and differences in sternum VII. In *M. dinoceps,* the lateral arms of sternum VII are in a tight arc so that together, they form an area longer than wide; in *M. mojavensis,* these arms are in loose curves so that they form an area wider than long. The lateral arm of *M. dinoceps* is of uniform thickness

beyond the medial expansion whereas in *M. mojavensis,* it is narrow then apically expanded.

Females of *M. dinoceps* are easily confused with those of *M. altadenae, M. chaenactidis* and *M. mojavensis.* From these, they differ by the shortened maxillary palpi, the fine and more dense scutal punctation, and in the sculpturing of the basal zone of the propodeum. They further differ from *M. mojavensis* by the broader head, and from *M. altadenae* and *M. chaenactidis* by the shorter scopal hairs and the sparser punctation of tergum II.

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Literature Cited

Bohart, G. E. 1942. A synopsis of the genus *Micralictoides.* Pan-Pac. Entomol., 18:119–123.

Michener, C. D. 1937. Records and descriptions of North American bees. Ann. Mag. Nat. Hist., (10) 19:313–329, 393–410.

———. 1965. A generic review of the Dufoureinae of the Western Hemisphere. Ann. Amer. Entomol. Soc., 58:321–326.

Timberlake, P. H. 1939. New species of the genus *Dufourea* from California. Ann. Entomol. Soc. Amer., 32:395–414.